DOCUMENT RESUME

ED 121 837 TM 005 269

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TITLE The Tuckman Teacher Feedback Form (TTFF).
NOTE 32p.; For a related document, see TM 005 270

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage
DESCRIPTORS Class Management; *Classroom Observation Techniques; Feedback; *Semantic Differential; *Teacher Behavior; Teacher Evaluation; Teaching Styles; Test Reliability; Test Validity
IDENTIFIERS *Tuckman Teacher Feedback Form

ABSTRACT

Originally designed to provide teachers with feedback and also used as a quantitative tool for specifying teacher behavior consistent with a psychological model of teaching described by Tuckman (1974), the Tuckman Teacher Feedback Form (TTFF) is a 28-item semantic differential which generates four scores in the areas of creativity, dynamism (energy plus dominance), organized demeanor (organization plus control), and warmth and acceptance. These dimensions refer to the teacher's means of interpersonal classroom management, that is, how the teacher deals with issues of control, ambiguity, and interaction. Kelly's (1955) theory of personal constructs explains the underlying purpose of the TTFF: both teacher and observer use personal constructs, conceived as bipolar adjective pairs, to interpret or construe the reality of the classroom. Given Kelly's argument that reality is a construction of the observer, the TTFF offers a procedure for eliciting and describing an observer's construction of a teacher's behavior. The instrument is short and efficient; as a measure of teacher style or behavior, it can be expected to be more objective than self-report measures and easier to use than coding procedures. Along with the instrument and Feedback Summary Sheet, information is presented on the validity of related research, reliability, availability, and use. (RC)

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THE TUCKMAN TEACHER FEEDBACK FORM (TTFF)

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NATURE OF THE INSTRUMENT

The instrument was originally designed to be used to provide teachers with feedback (Tuckman, 1971)--hence its name; but it has been useful also as a quantitative tool for specifying teacher behavior consistent with a psychological model of teaching described by Tuckman (1974). It is a short, 28 item, semantic differential which generates four scores, based on a factor structure described by Tuckman (1974), in the areas of creativity, dynamism (energy plus dominance), organized demeanor (organization plus control), and warmth and acceptance. These dimensions refer to the teacher's means of interpersonal classroom management, that is, how he or she deals with issues of control, ambiguity, and interaction.

PURPOSE

Kelly's (1955) theory of personal constructs explains the underlying purpose of the TTFF: both teacher and observer use personal constructs, conceived as bipolar adjective pairs, to interpret or construe the reality of the classroom. These personal construct dimensions have been further classified by Harvey, Hunt, and Schroder (1961) along a continuum of concrete and abstract, in terms of their characteristic use in

potential conflict situations. Using a set of relatively unstructured dimensions, observers can report their construction of reality to represent a picture of how the teacher is behaving. Given Kelly's argument that reality is a construction of the observer, the TTFF offers a procedure for eliciting and describing an observer's construction of a teacher's behavior.

DEVELOPMENT

Sixty-five adjective pairs containing adjectives which (1) appeared to be opposites, and (2) could be used to describe teacher behavior or to depict the manner by which teachers and observers construe reality, were collected and used by 84 graduate students to rate a teacher. A subsequent factor analysis yielded the dimensions and ultimate instrument described above.

VALIDITY OF RELATED RESEARCH

Some work on the construct and concurrent validity of the TTFF has been completed. Tuckman, Cochran, and Travers (1974) used it in conjunction with an evaluation of open classroom teachers, and found them to be more warm and accepting and more creative than conventional teachers. Tuckman (1974) reports that: (1) creative teachers allow students to do more structuring than do non-creative ones, (2) dynamic teachers do more structuring themselves and allow their students to do less soliciting (i.e., question asking) than do non-dynamic teachers, (3) organized teachers require more student responding (to their questions), and allow students to do less soliciting

and hence do less responding of their own than do less organized teachers. No interaction patterns were associated with warm and accepting teachers except that their students had more positive attitudes toward both themselves and school than did the students of less warm and accepting teachers. The findings in each case are consistent with expectations based on the nature of each dimension and the adjectives that measure it.

The TTFF has also been successfully used in two studies of teacher change (Spencer, 1973; Walencik & Tuckman, 1974). In each instance, teachers who were given feedback using the TTFF improved more on subsequent TTFF ratings than did teachers given unstructured feedback or no feedback. The instrument appears to have utility for the schools.

A study by Fabian (1975) attempted to relate the scores of 62 vocational teachers on the dimensions of the TTFF to their teaching competency as independently judged. Although the TTFF is not considered to be a measure of instructional competence, as a measure of a teacher's style or behavior in the interpersonal sphere there should be a tendency for creativity, dynamism, organized demeanor, and warmth and acceptance in that sphere to be greater in teachers who are more rather than less competent. Such an outcome would be considered evidence of the validity of the TTFF, particularly when coupled with previously obtained findings.

Teachers who were judged to be more competent by their principals on a single global measure of teaching competency were rated on the TTFF by an independent observer as considerably more creative and more organized than were less competent teachers. The more competent teachers were also rated as noticeably more dynamistic, and tended to be seen as more warm and accepting. Overall, teachers who were judged to be more competent were seen as being higher on the scales and dimensions of the TTFF. Correlations between the scores on the Pedagogic Competency Instrument, a device systematically designed to measure the competence of a teacher for planning and executing a lesson, and TTFF scores averaged .60; all four TTFF dimensions were significantly related to pedagogic competency, with the largest relationships being found for Organized Demeanor and the average of four scores.

RELIABILITY

Inter-rater reliability coefficients were reported by Fabian (1975) as follows: creativity, .62, dynamism, .77, organized demeanor, .67, warmth and acceptance, .38. Previously reported inter-rater reliabilities for the four dimensions were .75, .68, .22, and .53 respectively (Cochran and Tuckman, 1976).

AVAILABILITY AND USE

All references listed below as documentation are available, and the instrument and scoring sheet may be reproduced for research and development purposes without permission of the

author as long as proper attribution is credited. The instrument is short and efficient; as a measure of teacher style or behavior, it can be expected to be more objective than self-report instruments and easier to use than coding procedures. (See Tuckman, 1974.) Its use as part of a program of teacher intervisitation and feedback or within the regular supervision process has been described by Tuckman (1976).

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Person Observed_____ Observer_____

Date: _____

TUCKMAN TEACHER FEEDBACK FORM (Short Form)

1.	ORIGINAL	___:___:___:___:___:___:___	CONVENTIONAL
2.	PATIENT	___:___:___:___:___:___:___	IMPATIENT
3.	COLD	___:___:___:___:___:___:___	WARM
4.	HOSTILE	___:___:___:___:___:___:___	AMIABLE
5.	CREATIVE	___:___:___:___:___:___:___	ROUTINIZED
6.	INHIBITED	___:___:___:___:___:___:___	UNINHIBITED
7.	ICONOCLASTIC	___:___:___:___:___:___:___	RITUALISTIC
8.	GENTLE	___:___:___:___:___:___:___	HARSH
9.	UNFAIR	___:___:___:___:___:___:___	FAIR
10.	CAPRICIOUS	___:___:___:___:___:___:___	PURPOSEFUL
11.	CAUTIOUS	___:___:___:___:___:___:___	EXPERIMENTING
12.	DISORGANIZED	___:___:___:___:___:___:___	ORGANIZED
13.	UNFRIENDLY	___:___:___:___:___:___:___	SOCIABLE
14.	RESOURCEFUL	___:___:___:___:___:___:___	UNCERTAIN
15.	RESERVED	___:___:___:___:___:___:___	OUTSPOKEN
16.	IMAGINATIVE	___:___:___:___:___:___:___	EXACTING
17.	ERRATIC	___:___:___:___:___:___:___	SYSTEMATIC
18.	AGGRESSIVE	___:___:___:___:___:___:___	PASSIVE
19.	ACCEPTING (people)	___:___:___:___:___:___:___	CRITICAL
20.	QUIET	___:___:___:___:___:___:___	BUBBLY
21.	OUTGOING	___:___:___:___:___:___:___	WITHDRAWN
22.	IN CONTROL	___:___:___:___:___:___:___	ON THE RUN
23.	FLIGHTY	___:___:___:___:___:___:___	CONSCIENTIOUS
24.	DOMINANT	___:___:___:___:___:___:___	SUBMISSIVE
25.	OBSERVANT	___:___:___:___:___:___:___	PREOCCUPIED
26.	INTROVERTED	___:___:___:___:___:___:___	EXTRAVERTED
27.	ASSERTIVE	___:___:___:___:___:___:___	SOFT-SPOKEN
28.	TIMID	___:___:___:___:___:___:___	ADVENTUROUS

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Person Observed_____ Observer_____

Date:_____

TUCKMAN TEACHER FEEDBACK FORM -- FEEDBACK SUMMARY SHEET

A. Item Scoring

I. Under the last set of dashes on the sheet of 28 items write the numbers 7-6-5-4-3-2-1. This will give a number value to each of the seven spaces between the 28 pairs of adjectives.

II. Determine the number value for the first pair, Original -Conventional. Write it into the formula given below on the appropriate line under Item 1.

For example, if you place an "X" on the first dash next to "Original" in Item 1, then write the number 7 on the dash under Item 1 in the summary formula below.

III. Do the same for each of the 28 items. Plug each value into the formula.

IV. Compute the score for each of the 4 dimensions in the Summary formula.

B. Summary Formula and Score for the Four Dimensions

I. Creativity

Item (1 + 5 + 7 + 16) - (6 + 11 + 28) + 18
(_ + _ + _ + __) - (_ + __ + __) + 18 = __

II. Dynamism (dominance and energy)

Item (18 + 21 + 24 + 27) - (15 + 20 + 26) + 18
(__ + __ + __ + __) - (__ + __ + __) + 18 = __

III. Organized Demeanor (organization and control)

Item (14 + 22 + 25) - (10 + 12 + 17 + 23) + 26
(__ + __ + __) - (__ + __ + __ + __) + 26 = __

IV. Warmth and Acceptance

Item (2 + 8 + 19) -(3 + 4 + 9 + 13) + 26
(_ + _ + __) -(_ + _ + _ + __) + 26 = __

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TM005 270

Teaching: The Application of Psychological Constructs*

Bruce W. Tuckman

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The Model

George Kelly (1955) in his Psychology of Personal Constructs postulates that "...a person's processes are psychologically channelized by the ways in which he anticipates events, ...that a person anticipates events by construing their replications, ...that each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationships between constructs, ...that a person's construction system is composed of a finite number of dichotomous constructs." Put more simply, Kelly is saying that the central feature of human functioning is building a picture of reality, an ever-shifting one with recurrent patterns, that enables a person to deal with the future. By constructing a set of personal constructs based on experiences in the past, we become capable of processing information contained in new experiences and in turn formulating a reaction to these experiences.

By focusing on the model a person constructs for representing or construing reality, Kelly gave impetus to a focus in social psychology on information processing. His suggestion

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*Appearing in Hyman, R. (Ed.). Teaching: Vantage points for study. Philadelphia: Lippincott (2nd ed.), 1974, pp. 295-307.

that information processing might vary on a continuum of concrete to abstract gave rise to the development of a more delineated personality model by three of his former students, Harvey, Hunt, and Schroder (1961). They contended that people potentially passed through four stages of information processing and more characteristically became arrested in one of the four - thereafter called conceptual systems. They labeled these systems as absolute dependency, negative independency, conditional dependency, and interdependence where each system represented a more advanced state of conceptual complexity or abstractness. In absolute dependence, conflict is resolved by appeal to authority, norms and structure while in negative independence forcing or pushing against authority are manifested as conflict resolution mechanisms. Conditional dependency is characterized by a connectedness and mutuality to the social system while interdependency reveals a focus on problem-solving and the integration among alternatives. It is important to note that Harvey, Hunt, and Schroder viewed personal construct systems as vehicles by which persons deal with issues of control, interpersonal relations, and ambiguity.

The work of Kelly coupled with the work of Harvey, Hunt, and Schroder provides raw material for dealing with and theorizing about educational issues since teachers are principally confronted by problems of control, interpersonal relations, and ambiguity in classroom management

(Tuckman, 1967).* Of particular interest here is the description and analysis of teaching behavior and teacher style. Murphy and Brown (1970) have shown a relationship between the personality construct system of a teacher and his teaching style using the Harvey, Hunt, and Schroder framework. More abstract teachers were found to be more reflective (i.e., adaptive to change) and to reinforce search rather than attainment.

The result of the application of Kelly's psychology of personal constructs to education is a personal construct model of teaching which reflects itself both in a series of five propositions (based on Kelly's postulates) and a measurement technique which is appropriate for determining teacher behavior relative to the model.**

The first proposition to be offered is that the teacher relates to the environment around him by means of a set or system of personal constructs which he uses as a vehicle for processing incoming information. The second proposition states that these personal constructs act as a mediator between information which the teacher receives and subsequent behaviors that he emits. If these propositions are valid, then the key to understanding teacher behavior and its relation to situational demands

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*The author is himself a former student of Schroder's.

**It is noteworthy that the proposed model is as descriptive of the behavior of the measurer or theorist as it is of the behavior of the teacher since it reflects his system of personal constructs as inevitably any theory reflects the orientation of its builder.

is to determine the nature of the personal constructs used by the teacher. By personal constructs we mean the kind of dichotomized considerations as creative-routinized, warm-cold, fair-unfair, etc. that are implied by Kelly's work.

We may take our arguments one step further and propose a third proposition that the general kinds of personal constructs used by the teacher to construe his environment (of which incidentally he is a part; perhaps the most critical part) will also be the ones used by an observer to construe the behavior of a teacher in a classroom. This is an important proposition because it enables an outsider to operate within the same construct system as an insider in judging the behavior of the latter. This is a necessary link if we are to presume to describe teaching from the vantage point of the observer with any hope of providing an honest reflection of the teaching process.

Our fourth proposition states that personal constructs are organized into more stable and meaningful systems or clusters of constructs. Our fifth proposition states that the relative predominance of construct systems will reflect the characteristics of the situation, the disposition of the teacher, and the previous history of the teacher. Rather than dealing with large numbers of individual constructs, we shall look for sets or systems of constructs that tend to relate or go together. Tendencies that teachers

show on these construct systems can be expected to be different in different teaching situations such as in a large lecture hall before 100 students as compared to 12 students in a seminar room. Other factors will also affect teacher behavior.

The preceeding model of the teacher as information processer, following closely in the footsteps of Kelly, provides the basis for the development of a measuring instrument. If we view as the essence of teaching, those constructs and construct systems that teachers use for converting classroom inputs into teaching behaviors, then our measurement procedure must consist of a set of relevant and reasonably general constructs.

The Measure

The measure is called the Tuckman Teacher Feedback Form (TTFF), so named because it was originally designed for purposes of giving teachers feedback, and appears in Figure 1 (Tuckman, 1971). As can be seen, it is a series of 28 paired adjectives, each adjective having been paired with its approximate opposite (as opposed to its absolute opposite or negation. For example, "creative" is paired "routinized" rather than with "non-creative"). Each adjective pair represents a personal construct that can be used to construe the behavior of a teacher. The instrument

Person Observed_____

Date: _____

TUCKMAN TEACHER FEEDBACK FORM (Short Form)

1.	ORIGINAL	___:	___:	___:	___:	___:	___:	___: CONVENTIONAL
2.	PATIENT	___:	___:	___:	___:	___:	___:	___: IMPATIENT
3.	COLD	___:	___:	___:	___:	___:	___:	___: WARM
4.	HOSTILE	___:	___:	___:	___:	___:	___:	___: AMIABLE
5.	CREATIVE	___:	___:	___:	___:	___:	___:	___: ROUTINIZED
6.	INHIBITED	___:	___:	___:	___:	___:	___:	___: UNINHIBITED
7.	INCONOCLASTIC	___:	___:	___:	___:	___:	___:	___: RITUALISTIC
8.	GENTLE	___:	___:	___:	___:	___:	___:	___: HARSH
9.	UNFAIR	___:	___:	___:	___:	___:	___:	___: FAIR
10.	CAPRICIOUS	___:	___:	___:	___:	___:	___:	___: PURPOSEFUL
11.	CAUTIOUS	___:	___:	___:	___:	___:	___:	___: EXPERIMENTING
12.	DISORGANIZED	___:	___:	___:	___:	___:	___:	___: ORGANIZED
13.	UNFRIENDLY	___:	___:	___:	___:	___:	___:	___: SOCIABLE
14.	RESOURCEFUL	___:	___:	___:	___:	___:	___:	___: UNCERTAIN
15.	RESERVED	___:	___:	___:	___:	___:	___:	___: OUTSPOKEN
16.	IMAGINATIVE	___:	___:	___:	___:	___:	___:	___: EXACTING
17.	ERRATIC	___:	___:	___:	___:	___:	___:	___: SYSTEMATIC
18.	AGGRESSIVE	___:	___:	___:	___:	___:	___:	___: PASSIVE
19.	ACCEPTING (people)	___:	___:	___:	___:	___:	___:	___: CRITICAL
20.	QUIET	___:	___:	___:	___:	___:	___:	___: BUBBLY
21.	OUTGOING	___:	___:	___:	___:	___:	___:	___: WITHDRAWN
22.	IN CONTROL	___:	___:	___:	___:	___:	___:	___: ON THE RUN
23.	FLIGHTY	___:	___:	___:	___:	___:	___:	___: CONSCIENTIOUS
24.	DOMINANT	___:	___:	___:	___:	___:	___:	___: SUBMISSIVE
25.	OBSERVANT	___:	___:	___:	___:	___:	___:	___: PREOCCUPIED
26.	INTROVERTED	___:	___:	___:	___:	___:	___:	___: EXTRAVERTED
27.	ASSERTIVE	___:	___:	___:	___:	___:	___:	___: SOFT-SPOKEN
28.	TIMID	___:	___:	___:	___:	___:	___:	___: ADVENTUROUS

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Figure 1. The Tuckman Teacher Feedback Form (TTFF)
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may be used by any classroom observer - supervisor, trained observer, peer, or student, to describe the behavior of a teacher over approximately a 45 minute span of time. Rather than simply making notes, the instrument provides the observer with a more systematic means of recording his impressions of the teacher in the observation period.

The 28 scales are from among a larger list of 65 paired adjectives that were originally tested to form the instrument. The original 65 were collected to cover the widest range of teaching behavior with an eye toward blanketing the four system types developed by Harvey, Hunt, and Schroder and described earlier. In other words, an attempt was made to cover the teacher as a structurer, the teacher as an individual force, the teacher as a sociable person, and the teacher as a problem-solver, four ways that teachers can deal with problems of control, interpersonal relations, and ambiguity. Choices of adjective pairs were broadly fitted to this formulation while attempting not to overlook other aspects of teaching such as mood (e.g., cheerful - sad). The resulting list of 65 pairs was considered to be sufficiently broad for a first try with the instrument.

The procedure for scoring the TTFF is shown in Figure 2. Scores are obtained on each of four scales (described below). Scoring formulas involve pluses and minuses because adjective pairs appear with their "positive" pole

Person Observed _____ Observer_____

Date: _____

TUCKMAN TEACHER FEEDBACK FORM - - FEEDBACK SUMMARY SHEET

A. Item Scoring

I. Under the last set of dashes on the sheet of 28 items write the numbers 7-6-5-4-3-2-1. This will give a number value to each of the seven spaces between the 28 pairs of adjectives.

II. Determine the number value for the first pair, Original-Conventional. Write it into the formula given below on the appropriate line under Item 1.

For example, if you place an "x" on the first dash next to "Original" in Item 1, then write the number 7 on the dash under Item 1 in the summary formula below.

III. Do the same for each of the 28 items. Plug each value into the formula.

IV. Compute the score for each of the 4 dimensions in the Summary formula.

B. Summary Formula and Score for the Four Dimensions

I. Creativity

Item (1 + 5 + 7 + 16) - (6 + 11 + 28) + 18
(_ + _ + _ + __) - (_ + __ + __) + 18 = ____

II. Dynamism (dominance and energy)

Item (18 + 21 + 24 + 27) - (15 + 20 + 26) + 18
(__ + __ + __ + __) - (__ + __ + __) + 18 = ____

III. Organized Demeanor (organization and control)

Item (14 + 22 + 25) - (10 + 12 + 17 + 23) + 26
(__ + __ + __) - (__ + __ + __ + __) + 26 = ____

IV. Warmth and Acceptance

Item (2 + 8 + 19) - (3 + 4 + 9 + 13) + 26
(_ + _ + __) - (_ + _ + _ + __) + 26 = ____

Figure 2. The Feedback Summary and Scoring Sheet for the Tuckman Teacher Feedback Form.

on both left and right ends of scales to minimize response set bias; constants are added to each formula to set minimum scores at 1 and thus avoid negative scores. On each factor, 43 is the highest score obtainable.

It must be pointed out that the TTFF item format was not only consistent with Kelly's approach to construing reality but was also equivalent to what Osgood, Suci, and Tannenbaum (1957) called the semantic differential, a technique designed to measure the meanings implicit in the judgment of social reality. The work of Osgood et al. revealed that general adjective pairs, when used to judge objects of attitudes, yielded the following three clusters or factors: evaluation (e.g., good - bad), potency (e.g., strong - weak), and activity (e.g., active - passive). However, Osgood et al. pointed out that somewhat different factor structures result when the adjective pairs used are more specific and relevant to the object being judged as would be true in the case of the Tuckman Teacher Feedback Form.

The 65 adjective pairs of the TTFF were given to 84 graduate students in education and each was asked to use it to judge one of his/her graduate instructors. The resulting ratings were submitted to factor analysis, the results of which appear in Figure 3. Figure 3 reveals the four principal factors that emerged from the analysis and

FACTOR 1 CREATIVITY		FACTOR 2 DYNAMISM	
CREATIVE-ROUTINIZED	(.84)	OUTGOING-WITHDRAWN	(.82)
IMAGINATIVE-EXACTING	(.83)	OUTSPOKEN-RESERVED	(.81)
EXPERIMENTING-CAUTIOUS	(.81)	BUBBLY-QUIET	(.73)
ORIGINAL-CONVENTIONAL	(.77)	EXTRAVERTED-INTROVERTED	(.78)
ICONOCLASTIC-RITUALISTIC	(.72)	AGGRESSIVE-PASSIVE	(.76)
UNINHIBITED-INHIBITED	(.66)	ASSERTIVE-SOFT-SPOKEN	(.73)
ADVENTUROUS-TIMID	(.66)	DOMINANT-SUBMISSIVE	(.71)

FACTOR 3 ORGANIZED DEMEANOR		FACTOR 4 WARMTH AND ACCEPTANCE	
SYSTEMATIC-ERRATIC	(.83)	WARM-COLD	(.79)
ORGANIZED-DISORGANIZED	(.76)	SOCIABLE-UNFRIENDLY	(.77)
PURPOSEFUL-CAPRICIOUS	(.74)	AMIABLE-HOSTILE	(.76)
CONSCIENTIOUS-FLIGHTY	(.71)	PATIENT-IMPATIENT	(.74)
IN CONTROL-ON THE RUN	(.62)	FAIR-UNFAIR	(.72)
OBSERVANT-PREOCCUPIED	(.58)	GENTLE-HARSH	(.69)
RESOURCEFUL-UNCERTAIN	(.55)	ACCEPTING (PEOPLE)-CRITICAL	(.67)

Figure 3. Results of the Factor Analysis of the TTFF. (Numbers in parentheses represent factor loadings; N = 84 teacher observers.

were subsequently names: creativity, dynamism, organized demeanor, and warmth and acceptance. The seven adjective pairs having the highest factor loadings on each factor were taken from the original 65 to form the TTFF (Short Form) shown in Figure 1. Each factor can be considered to represent a cluster of constructs which both the teacher and the observer of teaching use to construe teaching behavior (that is, the result of the way the teacher processes information).

The creative teacher is seen as being not only creative but imaginative, experimenting, original, iconoclastic, uninhibited, and adventurous as well. This factor bears some relation to Harvey, Hunt, and Schroder's (1961) stage of interdependence which Tuckman (1967) has characterized as being a combination of abstractness in information processing and independence in terms of one's restrictedness only by the environment rather than by people in it. This type of teacher controls by his manipulation of the learning environment.

The dynamic teacher is seen as outgoing, outspoken, bubbly, extraverted, aggressive, assertive, and dominant. He is a personally forceful and commanding teacher and in some ways not unlike Harvey, Hunt, and Schroder's negative independent type. In essence, he used "force" as a means to control student behavior and achieve goals.

The organized teacher is not only organized but systematic, purposeful, conscientious, in control, observant, and resourceful. This type of teacher controls in a more managerial capacity and bears some resemblance to Harvey, Hunt, and Schroder's absolute dependent type whose unilateral approach to training serves to reduce ambiguity and risk.

Finally, the warm and accepting teacher is in addition sociable, amiable, patient, fair, gentle and thus achieves "control" by relating to his students, not unlike Harvey, Hunt, and Schroder's conditional dependency or mutuality type.

It is important to emphasize two points. First, consistent with Osgood, Suci, and Tannenbaum's (1957) work on the semantic differential, each of the 28 scales on the TTFF cannot be considered an independent dimension; but that those dimensions that fall on the same factor can be considered to mean the same (or similar) thing to the persons making the judgment. In terms of Kelly's formulation, it would be argued that in an area such as teaching, neither the teacher nor the observer can use as many as 28 dimensions independently to construe the environment and that consequently clusters or systems of constructs are employed. The second point is that all teachers exhibit some degree of each factor, assumedly as a function of their

personality, training, and the situation in which they are teaching. We are ultimately then talking about differences in degree in construing teacher behavior along the four proposed dimensions.

Properties of the Measure

Let us examine existing evidence bearing on both the reliability and the validity of the TTFF. In the instance of reliability, it is of value to consider both the internal reliability of the instrument and its inter-rater reliability. As regards internal reliability, the factor analysis demonstrates a high degree of inter-item agreement within each factor as evidenced by factor loadings ranging from .55 to .84 (see Figure 3). Inter-rater reliabilities are reported by Tuckman, Cochran, and Travers (1973) for a pair of trained observers over 15 observations as averaging .55 across the four dimensions. Most recently, corrected reliabilities ranging from .65 to .90 have been obtained over a sample of 31 open classroom teachers observed by a pair of observers (unpublished report). Walencik (1973) had high school students serve as the observers of student teachers (using an altered scoring procedure for the TTFF) and reported corrected correlations averaging .91 between arbitrarily designated class halves of 16-member classes across the dimensions of the TTFF.

On the matter of validity, the relationship between the TTFF and STudent Opinion Questionnaire (SOQ; Bryan, 1963) has been examined as a test of concurrent validity. Walencik (1973) reports high correlations between TTFF scales and those SOQ scales that seem by wording that they should be measuring corresponding things. Moreover, the two instruments show moderate but significant correlations overall. To establish the construct validity of the TTFF, the research studies described below have been completed.

Research Applications

Tuckman, Cochran, and Travers (1973) used the TTFF to compare teachers trained in the use of open classroom philosophy and techniques to others not so trained. They found the open classroom teachers to be significantly more warm and accepting and to show a tendency to be more creative than the "traditional" teachers with no differences on the other two dimensions. Moreover, in comparing the scores of teachers on the four dimensions of the TTFF to measures of classroom management and process and to measures of subsequent student outcomes, the correlations shown in Figure 4 were obtained. These findings are consistent with one's expectations assuming the validity of the TTFF and hence provide some evidence of its construct validity.

	Classroom Process											Outcomes		
	Flexible Use of Space	Similtaneous Activity	Similtaneous Groupings	Teacher Structuring**	Teacher Soliciting**	Teacher Responding**	Teacher Reacting**	Student Structuring**	Student Soliciting**	Student Responding**	Student Reacting**	Attitudes Toward Self	Attitudes Toward School	Achievement***
TTFF														
Creativity	.67*	.47*	.41*	.14	-.05	-.09	-.12	.40*	.06	-.17	.24	.32	.50*	.03
Dynamism	-.29	-.07	-.26	.41*	-.03	-.30	.44*	.08	-.45*	.12	-.31	.30	.14	.26
Organized Demeanor	-.06	-.21	-.60*	.16	.23	-.51*	.13	-.06	-.52*	.42*	-.23	.04	.01	.12
Warmth & Acceptance	.72*	.26	.14	-.07	.24	-.28	-.03	.12	-.14	.02	.22	.40*	.57*	-.16

*p=.01
**Bellack Coding Category
***California Achievement Test

Figure 4. Rank Order Correlations Between TTFF Scores and Measures of Classroom Process and Outcomes (N=30)

The TTFF was designed primarily to be used for the modification of teacher behavior (Tuckman, 1971) and grew out of the work on teacher feedback done by Tuckman and Oliver (1968), Tuckman, McCall, and Hyman (1969), and Gage, Runkel, and Chatterjee (1960). Following the assumption that the instrument measured the behavior of the teacher on the four general construct systems described above, and hence held meaning for teachers in terms of how they processed information in their teaching environment and consequently reacted to situations of control, interpersonal relations, and ambiguity, it was reasoned that feedback in these areas would result in altered teaching behavior.

Spencer (1973) used the TTFF as part of a microteaching procedure with teachers about to begin their teaching careers. Propective teachers were asked to rate their ideal teacher on the TTFF at the start and end of the training session. Some teachers were rated by their fellow trainees on the TTFF following microteaching while others were not. Following feedback, a second lesson was taught and the TTFF used to judge performance in all instances. Follow-ups were done some months later by supervisors on selected teachers. Spencer found that teachers who received feedback on the TTFF changed their ideal (presumably a measure of their teaching philosophy) significantly more than teachers

who did not receive TTFF feedback but who received "conventional" feedback (termed "unstructured" by Spencer), particularly on the dimension of warmth and acceptance. In other words, exposure to the TTFF increased a teacher's use of warmth and acceptance in construing his ideal teacher indicating an increasing sensitivity to this system. Moreover, TTFF feedback caused teaching behavior to significantly improve (i.e., change in the direction of the ideal) more so than conventional feedback on warmth and acceptance and dynamism. Since the majority of Spencer's teachers were skilled craftsmen recruited directly out of industry and were about to enter teaching with no experience or training save Spencer's week-long workshop, the increasing emphasis brought upon warmth and acceptance constructs by the TTFF was considered an important accomplishment. It must be noted that differences were not reported three months later though rater differences and smaller samples had undoubtedly contributed to their absence.

Walencik (1973) worked with student teachers at a state college and had their high school students rate their behavior using the TTFF and a modified scoring procedure. Some of Walencik's student teachers received feedback on the TTFF while others received conventional supervision. Over all construct systems, student teachers who received

TTFF feedback changed more than students not receiving such feedback, indicating the effectiveness of the TTFF as an element in the change process. Walencik also found change to be a function of the difference between actual behavior and ideal behavior, termed dissonance, which the TTFF apparently transformed from a change potential to an actual change.

While the above studies are not definitive, together they do indicate potentially effective uses for the TTFF. An additional study, presently planned, will employ a peer feedback approach with the TTFF at the two-year college level and will compare various techniques with which the feedback will be given. It will also provide another opportunity to examine the factor structure of the TTFF.

Conclusions

Remmers (1963) suggests that the following five factors be considered in evaluating a judgment-recording instrument for observations of teaching behavior: objectivity, reliability, sensitivity, relevance, and utility. Although considerably more work needs to be done with the TTFF to establish its psychometric credentials, it has to date yielded (1) verifiable and reproducible data (objectivity), (2) consistency over items and over judges (reliability), (3) discriminable differences between teachers and between teacher feedback conditions (sensitivity), (4) relatedness to the Kelly-derived construct systems and

applicability to the real educational problem of changing teacher behavior (relevance), and (5) evidence of its efficiency and practility in administration and use (utility).

The TTFF approach has been used with student judges, peer judges, and trained observers and has worked satisfactorily in each instance. It has been used as an element in a program aimed at changing teaching behavior, and as a vehicle for judging the behavior of teachers trained in open classroom techniques. Open classroom teachers were found to score differently than conventional ones, the former being warmer and more creative. TTFF scores were also shown to be related to other classroom measures. Feedback from the TTFF was shown to be effective in causing new and prospective teachers to change both their behavior and their teaching philosophy within reasonably short periods of time.

As an instrument based on the psychology of personal constructs, the TTFF offers both the practitioner and the researcher a way to characterize teaching behavior without the training and time demands imposed by a coding system while yielding useable data on four major aspects of teaching behavior. It is not intended as a device for measuring all aspects of teaching behavior (e.g., lesson-planning, testing, for two, are not explicitly dealt with) but does quickly and efficiently show how a teacher is seen as

processing information within a social reality. Further studies, applications, and psychometric analyses will suggest considerations for additional uses of the TTFF. Users are encouraged to extend it in new but appropriate directions.

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